

## Information Competence as a Means of Developing Leadership Qualities in Student-Teachers

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### ABSTRACT

Nowadays, the world requires skilled specialists in all spheres of life. In turn, the effectiveness of their education depends on both their will and the teacher's professionalism. This study investigates the advantages of the implementation of information technologies and the possible associated difficulties. It was found that in order to achieve the desired effect and to improve significantly the training level of young specialists, including student-teachers, it is necessary to change radically the concept of education and to create new exceptional and innovative methods that would meet the requirements and rate of development of modern technologies in the twenty-first century. It is worth mentioning the other factors that affect the effectiveness of new educational methods, for instance, the personal interest of teachers, diligence, and enthusiasm of students for the new approach. Considering the rate at which innovations are being implemented in all spheres of life and the fact that both the younger and older generation have to use modern technologies, one should expect that in the near future, the demand for highly skilled specialists will rise sharply in various fields, which requires developing and implementing new educational methods. It is worth noting that old methods are becoming ineffective and incapable of yielding practical results in areas where new methods that use advanced technologies provide for complete understanding of the material, process or practical value for the students.

### KEYWORDS

Modern technologies, new methods, improvement of education, pedagogy, effectiveness of education

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## Introduction

The strategy of development of higher education is based on latest achievements and the experience that was accumulated over the history of social development. The dynamic improvement of the educational system is impossible without the active use of modern innovative technologies in the training of prospective specialists, particularly teachers.

Considering that the effectiveness of teaching and education was always based on the personality of the teacher and his or her professional competence,

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the modern requirements to pedagogical education have changed completely in terms of both the necessity of implementing new teaching methods and the professional qualities of the teacher (Borich, 1988).

The society exists and develops in an age of information technologies; the reality of the twenty-first century is the rapid development of electronics and communication, which enables mass education of people of any age, regardless of their place of work or residence (Panin, 2007).

The informatization of the modern society and education is characterized by the improvement and mass spread of information technologies. They are widely used to transfer information and to provide for teacher-student communication in the modern educational system. Therefore, teachers should not only have knowledge of information technologies, but also use them in their professional activity (Grigoryev & Grinshkun, 2005).

Modern technologies are being used in increasingly more fields of education. This is facilitated by both external factors, associated with a comprehensive informatization of the society and the need for appropriate training of specialists, and internal factors, associated with the spread of computer technologies and software in educational institutions, adoption of national and international programs of educational informatization, and the fact that more teachers and students are gaining required experience of informatization.

It is worth noting that in most cases, the use of informatization means has a positive effect on the intensification of teachers' labor in high school and the effectiveness of student training and the development of their leadership qualities (Sife, Lwoga & Sanga, 2007; Laurillard, 2013).

Therefore, in order to follow the trend of proper education and improvement of students' and teachers' proficiency in technologies, it is necessary to change the system of highly-skilled teacher training, after which the implementation of advanced technologies and the improvement of the level of teaching will integrate faster into the system of modern education (Redlikh & Kozyreva, 2011).

## Literature Review

This study aims to describe all aspects of informatization and improvements associated with advanced technologies in various educational systems, based on various sources, in particular, the aspects that may affect the desired result, which is why emphasis is placed on the nuances related to changes in the modern educational methods.

In order to implement information technologies in various fields of modern education, it is necessary to highlight certain factors that affect this process. These factors include the concept of teachers' information competence and the students' motivation to learn.

In terms of the indicators of information competence, it is possible to distinguish the following ones (Bobonova, 2009):

- 1) Effective access to information and analytical processing;
- 2) Formation and development of personal leadership qualities;
- 3) High level of communication culture;
- 4) Collective reflection and self-reflection;

5) Culture of reception, selection, storage, reproduction, presentation, transfer, and integration of information.

This concept is also interpreted as "new literacy", which means the ability to process information actively and independently, with modern methods and advanced technologies, to make essentially new decisions in unpredictable situations using technological means (Semyonov, 2000).

It is worth bearing in mind that the use of innovative and interactive teaching methods should not have a negative effect on the role of the teacher in the educational process. Pedagogical innovations should correspond with the general goals of education and the content of classes, thus improving their results significantly. Nowadays, students receive excess information, but this information is not always well-structured and of high quality; therefore, a special role is played by the class architectonics – the general esthetic plan of its construction, which is in harmony with the value and goal system of the class and its content.

At present, the task of the teacher is to select and structure the material, and present the information to the students at the proper place and at the proper time. It is impossible to develop the competencies of prospective specialists without such a presentation of information and its association with a specific subject area. With that, it is worth bearing in mind the necessity of associating blocks of information about reality with reality itself. The emergence of new information technologies in education shifts the students' and teachers' attention to the technical aspect of teaching. The assumption is that high-quality education implies the availability of computer classes, multimedia and engineering technologies. However, these are merely "tools", auxiliary means that facilitate the teaching process, but do not replace it. In addition to innovative and interactive methods, education should be based on live communication between the teacher and students, between teachers, between students, and between students and representatives of companies.

In order to get a comprehensive idea of information competence, it is worth distinguishing one of its definitions: "an integrative personality trait that results from the reflection of selection, assimilation, processing, transformation, and generation of information in a special type of subject-specific knowledge, which enables generating, making, predicting, and acting upon optimal decisions in various fields of endeavor" (Trishina, 2005).

Information competence has the following properties (Trishina, 2005):

- dualism – an objective (external evaluation of information competence) and subjective (internal self-evaluation of one's information competence) aspect;
- relativity – knowledge and knowledge bases go out of date quickly, which is why they can be considered new only in specific space and time;
- structure – each person has his or her knowledge bases organized in a special way;
- selectivity – not all received information is transformed into knowledge that is integrated into existing organized knowledge bases;
- accumulation – knowledge and knowledge bases tend to "accumulate", expand, and extend with time;



- self-organization – new structures of knowledge bases tend to emerge in non-equilibrium systems;
- multifunctionality – the presence of various subject-specific knowledge bases (the semantic component of knowledge bases is multifunctional).

Considering the above, the conclusion is that the implementation of innovative technologies in educational systems should focus on the various properties and capacities of these systems, with a view to achieving the required result.

In terms of the functions of information competence, the following should be emphasized (Vinogradova, 2012):

- 1) cognitive, aimed at the systematization of knowledge, human knowledge and self-knowledge;
- 2) communicative, which is performed by the cultural and semantic bearers of information;
- 3) adaptive, which enables adapting to living and workplace conditions in an information society;
- 4) regulative, which manifests as a system of moral and legal regulations and requirements in an information society;
- 5) evaluative, which implies the ability to handle various information, detect and select known and new information, and evaluate information of primary and secondary importance;
- 6) interactive, aimed at the active independent and creative work of the subject, which leads to self-development and self-fulfillment.

The development of information competence should result from the information-computer training of specialists. The result of the development of information competence is related to the expedient choice and use of information technologies and computer means that are required by a modern competitive specialist and the development of the ability to use them to solve professional problems.

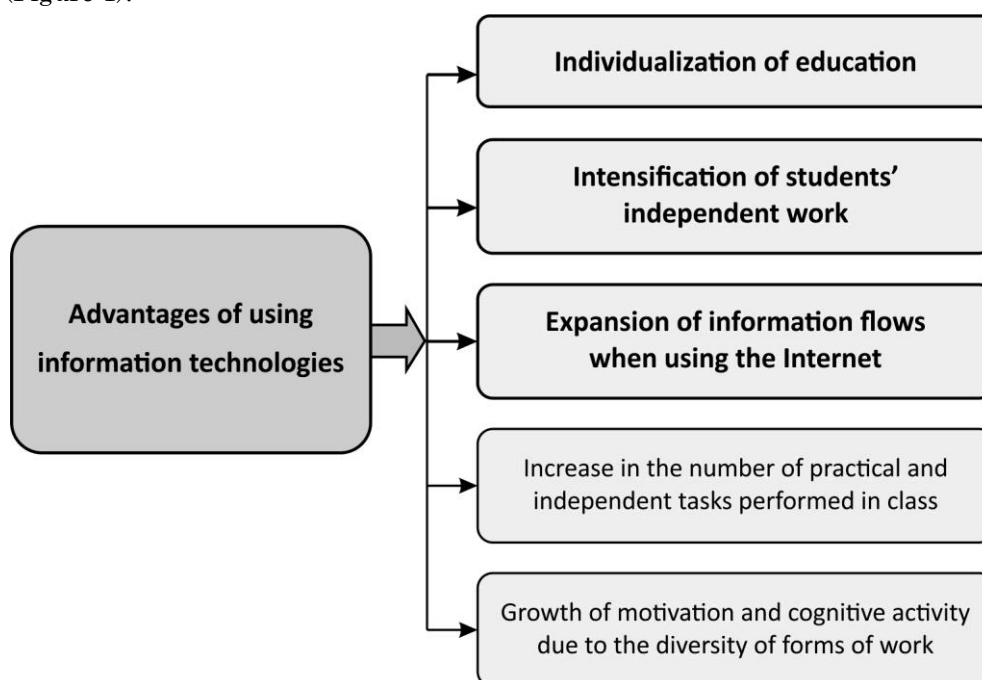
Information technologies used in the educational process aim to provide high-quality training of prospective teachers, facilitate personal development, develop creative abilities in students through special computer and software means, called means of education informatization.

For instance, information technologies provide access to academic, methodological, and scientific information, enable organizing timely consulting assistance, modeling research activity, and holding real-time virtual classes (seminars, lectures) (Zakharova, 2003).

Modern technologies, such as e-mail and teleconferences, enable distributing online communication between the participants of the educational process in space and time. Such approaches enables exchanging information (questions, answers, supplementary material, and tests), which allows teachers and students to analyze received messages and respond to them at a convenient time (Sclater, 2010).

With each year, new information means and technologies appear that are important for the informatization of education. Listing and especially studying all of them is impossible. Under certain conditions, many of these technologies

can have a significant effect on the quality of training and education of students (Figure 1).



**Figure 1.** Advantages of using information technologies

In order to achieve the highest level of educability improvement, it is necessary to use not only advanced technologies, but also the experience and skills of specialists in various fields, whose involvement is required to achieve the goals of informatization.

By using methods with the implementation of information technologies in student teaching and by gradually involving them in the solution of near-workplace problems, it is possible not only to develop their abilities, independence, and creative thinking, but also to significantly reduce the time it takes for university graduates to adapt to real workplace conditions (Vitt, 2005).

The switch to the information society requires the system of education to solve an essentially new problem of training people that are adapted to rapidly changing realities and capable not only of perceiving, storing, and reproducing information, but also of generating new information, managing information flows, and processing them effectively. The change in the requirements to specialists is dictated by the emergence of new types of theoretical and practical problems, characterized by systematic and interdisciplinary nature, irregularity, and global possible consequences.

Such problems have no simple and decisive solutions, which requires changing significantly the nature of the entire professional activity of specialists and training new specialists, capable of seeing the "big picture", taking a creative approach to searching for a solution, predicting its result, and recognizing their personal contribution and responsibility. In the modern society, where information is valued as much as material resources, while the processing and maintenance of its growing volume up to date is possible only



through computer equipment, new requirements are specified to the quality of specialist training in the field of new information technologies.

### ***Trends in the development of information competence in student-teachers***

Modern teachers should not only have knowledge in the field of information technologies, which is part of the computer science course, studied in pedagogical high schools, but also be proficient in using new technologies in their professional activity.

The requirements to the use of information technologies are as follows (Paris OER Declaration, 2012):

- conscious choice of educational technologies, including information technologies, as well as electronic educational resources;
- control and assessment during the educational process using modern means of assessment based on information and communication technologies (electronic documentation, including an electronic register and students' journals);
- basic skills of working with text editors, electronic tables, e-mail, browsers, and multimedia equipment.

The trends in the development of information competence in student-teachers are as follows:

1. Shift of emphasis from technological problems (related to the proficiency in various tools and specific software) to pedagogical ones.

The information educational environment should include electronic educational resources, "electronic" journals and registers, the school website, an environment for the students' electronic profile, etc.

High schools face a similar situation, where all processes are transformed under the State Program for the Development of Education (On the Approval of the State Program for the Development of Education, 2016). On the other hand, the circumstances related to the technological support of the educational process are also changing constantly. This means that teachers and students, in case of independent learning, are now responsible for selecting the available IT tools.

2. Spread of "cloud technologies" and global learning platforms (educational environments), wherein the distributed resources, created by the interaction of authors, play a major role. Web-technologies united all previously existing solutions (from e-mail to file archives) through a universal interface and created a multimedia platform for the collective solution of IT problems based on high-speed lines.

The development of individual local offline products (presentations of classes, individual schedules, etc.) is pointless, since it is possible to find a decent sample of virtually any product on the Internet; therefore, wasting effort on creating something similar is unreasonable – it is more expedient to engage in the improvement of existing versions of such products (Sclater, 2010). For instance, instead of writing one's own article on a wiki-resource, it is more reasonable to edit the existing one (which may require a more in-depth study of the material). The second trend means a switch to collective creative work in an environment of collective authors, which emphasizes skills of social interaction, learning process management, and presentation of creative work.

3. Focus on reflection. Changes in the nature and form of problems make conventional techniques of control and assessment ineffective. The control of the correctness of an unambiguous answer is replaced by the control of versions, monitoring of the chronology of changes in the product that is a result of collective creative work. The assessment concerns not only the obtained result in this or that form (with the exception of cases when the studied subject is a standard or regulatory document), but also the active participation of an individual in the group project and his or her readiness for reflection with respect to achieved results.

At the physical level, reflection results in an electronic profile in the form of the author's website, blog or forum, which is also an IT tool (Obraztsov, 2000, p. 46). At some point, the teacher becomes incapable of evaluating the technologies objectively due to the fact that they change rapidly, thus losing his or her expertise. The third trend means that general pedagogical competencies are gaining significance in teaching IT, i.e. the skills of the organizer of the learning process in an educational environment, a tutor, as opposed to the technological skills of a programmer or designer.

Considering the above factors, it is worth noting that the use of knowledge and skills in teaching people that require basic skills and knowledge in various fields provides good practice and experience for student-teachers (Laurillard, 2013).

The conclusions based on this study may help to improve the development of information competence in technical high school students; the designed model of development of information competence can be implemented in the practice of high schools; the research materials may be used in the learning and educational process of technical high schools.

## Results

In terms of the various research in the field of advanced teacher training and improvement of student education, it is worth noting that this factor increases with the implementation of innovative technologies.

Therefore, universities should modify the educational system and give teachers the opportunity to improve their proficiency in modern technologies and to let students feel more comfortable, which will improve the level of education and the rate of learning (Vangelisti, Daly & Friedrich, 2013).

The content of the programs of prospective teacher training with respect to their use of IT in professional activity should be designed with regard to the regularities of development of information competence.

When using information technologies, the teacher should bear in mind that these tools are incorporated into the learning process as "auxiliary" means that support conventional methods of the educational system.

The use of information technologies is reasonable and will improve the effectiveness of education if it corresponds with the specific needs of the educational system, if teaching the full scope of the material is impossible or difficult without respective means of informatization.

After investigating the role of information technologies in the learning and education of students, it is possible to state that a properly created educational environment in high school may give "impetus" and create favorable conditions





and give opportunities to students with analytical thinking for engaging in independent search activity in this or that field of education.

The modern educational paradigm requires prospective teachers to have professional competence that meets the demands of time and the society, as well as leadership skills that manifest in the ability to motivate, plan, and organize one's professional activity (On the Approval of the State Program, 2016).

### ***Through Information Technologies to Leadership***

Leadership is a necessary quality for a competent and skilled teacher. Leadership allows a person to prove him- or herself in a sociocultural environment by leading others and encouraging them to prove themselves when navigating towards the goal (Mardakhayev, 2014).

The assumption is that successful leadership is characterized by a high level of professionalism alongside necessary personal characteristics. In other words, the development of leadership qualities is a purposeful involvement of an individual in professional activity, wherein the social environment, the individual, and the group interact, activating, as a result, the psychological mechanisms that motivate an individual to engage in the activity, thus facilitating his or her dynamic development during professional establishment through a properly organized system of tutorship and improvement of self-development, aimed at the consistent realization of the basic and higher needs, with a view to achieving the self-actualization of a personality (Kovalev, 2014).

The study titled "Teachers' Leadership Qualities: Essence and Structure" defines a leader as an individual that plays the key role in a group in terms of the direction, control, and changes of the activity of other members of the group aimed at achieving common goals. The term "teachers' leadership qualities" is defined as integral quality systems that provide for the quickest and most effective achievement of a common educational goal in a specific educational situation in the collective activity of the teacher and the student (Kempster & Stewart, 2010).

Considering the characteristics of pedagogical activity, researchers distinguish two groups of teachers' leadership qualities (Figure 2) (Kovalev, 2014).

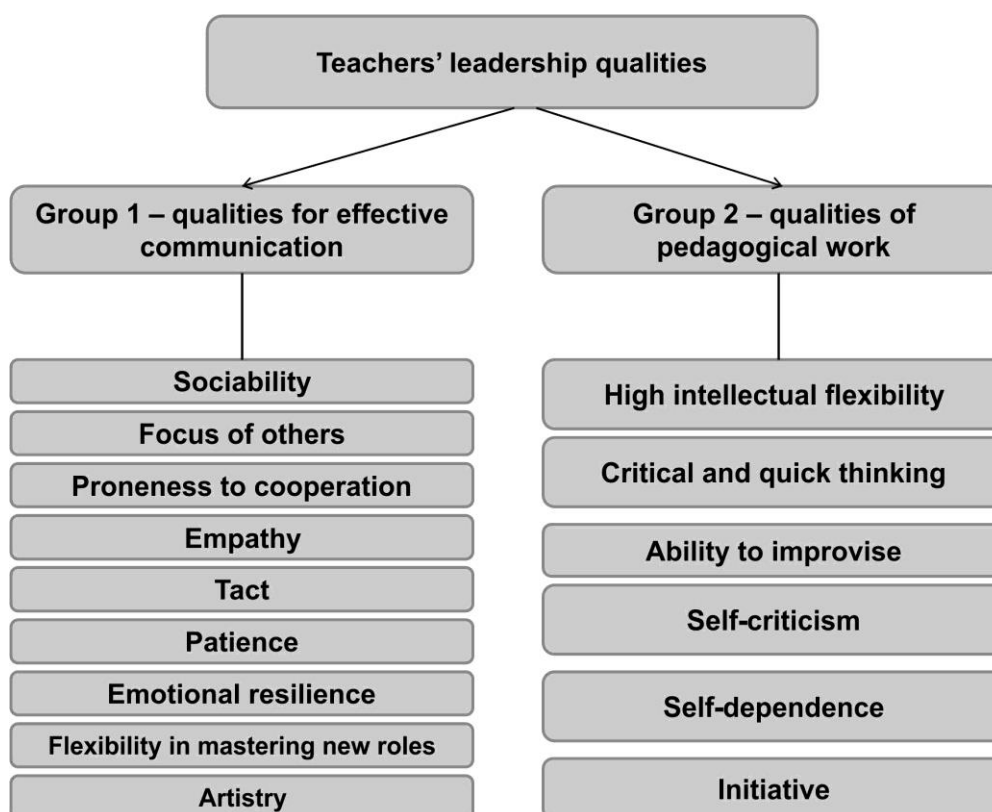
After investigating the studies, it is worth noting that the main leadership qualities can also include the following personality traits:

- 1) independence;
- 2) discipline;
- 3) consistency;
- 4) internal motivation;
- 5) reflection.

All the above confirms that the activity and high-quality occupational training of prospective teachers in high school are inextricably related. In other words, a professional in one's field of endeavor is also a leader in this field. The person becomes a leader through his or her activity.

Thus, it is possible to conclude that activity makes a student a "leader". The activity of a higher educational institution manifests in the educational process, which should include the development of leadership qualities in students.





**Figure 2.** The main leadership qualities of teachers

Unfortunately, high schools devote very little time to the development of leadership qualities in students during learning, since they mostly use primary teaching methods – lectures and seminars.

The teacher has a direct effect on the development of leadership qualities in students. The active involvement and interest of students in learning depends on properly organized curricular and extracurricular activity. Students should not only extend their knowledge, but also develop in general and master the latest achievements of science and technology, so as to adapt easily in their future professional activity (Zorina, 2008).

The creation of favorable conditions for the formation and development of leadership qualities in students largely depends on the strategy of the teacher, his or her pedagogical mastery, the pedagogical conditions that have to be designed, created, and improved, and on his or her professional information competence (Kadisha & Alimbekova, 2014).

The information competence of a modern teacher is one of the most important indicators of the level of success of his or her activity and, at the same time, a prerequisite for the further improvement of his or her professional competence, which determines the importance of the IT-technology-based training of modern teachers.

The UNESCO ITC Competency Standards for Teachers: Competency Standard Modules, which emphasize not only the need to develop teachers' IT competency, but also the orientation on updating conventional techniques,



methods, and technologies of education based on IT, may be used as a conceptual framework for the development of such programs. After the development and official launch of multilingual versions of the UNESCO ICT Competency Framework for Teachers (ICT-CFT) in 2011-2012, this document has become the groundwork for the development of national (regional) standards of teachers' IT competency. However, the UNESCO suggestions should be regarded as guidelines and adapted to the peculiarities of national, including Kazakh, educational systems, the features of informatization, ethnic, national, and cultural traditions, etc. (Buckingham, 2012).

### ***Pedagogical conditions of the development of leadership qualities in students***

The content of pedagogical education, which includes the use of information technologies that are associated with the acquisition of such key competencies as social, communicative, information, cognitive, and special, will become more in-depth and reasonable if the following conditions are met:

- creation of real conditions for the training of teachers capable of participating actively in the execution of national and regional programs of educational informatization;
- considerable improvement of the level of professional and general academic interaction of teachers and students through collective projects, including telecommunication projects;
- creation of qualitatively new conditions for the realization of students' creative potential by expanding the capacities of conventional libraries and high school laboratories through access to electronic libraries and virtual laboratories, scientific, academic, and other Internet resources of cultural and social importance;
- improvement of the effectiveness of students' independent work with conventional and electronic resources by means of developed systems of self-assessment and maintenance of feedback with the teacher;
- continuous open education, during which students can take active part in the organization of the learning process by choosing courses that are available at any given time thanks to telecommunication.

The above conditions help to achieve the main goal – to improve the quality of education, to make education more accessible, and to provide for all-round development of an individual personality and of the entire information society (Zakharova, 2003).

### **Discussion and Conclusion**

Cooperation of the teacher and students enables the latter to prepare independently presentations on practical topics, various tests, games, and programs for their pedagogical internship and work at educational institutions (Zorina, 2008).

Considering that an all-round qualification of a teacher is one of the requirements of modern education, a modern teacher should not only master the knowledge in the field of his or her professional activity, but also become competent enough to teach and educate the younger generation properly (Paris OER Declaration, 2012).

Students' learning is based on the interaction of teachers and students, which takes place in both curricular and extracurricular activity through the following educational methods:

- methods of teaching: lecture, narration, demonstration, explanation, conversation, visual material, active teaching – problem exposition, discussion, learning, imitation, role-play, organizational, operative, business, and other games, case method, etc.;
- methods of learning: listening, comprehension, exercise, studying of textbooks and sources, modeling, reproductive, partial search, research, etc.;
- methods of education: development of personal consciousness – explanation, persuasion, narration, conversation, suggestion, briefing, request, example; behavioral development – exercise, inurement, requirement, assignment, open interpersonal communication, creation of educating situations, game methods, trainings, extracurricular events – cultural and social events, participation in social life, etc.;
- methods of motivation: encouragement, competition, approval, reward, etc.

Education is the responsibility of not only the teacher, but also the students. Therefore, while the educational institution provides necessary modern technologies, the students themselves should search and find new information on the Internet and have the ability to use it to achieve set goals, for instance, to use Wikipedia (Pendergast, Garvis & Keogh, 2011).

Conscious actions on both sides (the teacher and the student) help to form leadership qualities during occupational training in high school; they may be effective provided intensive activity of students, motivation for self-improvement, independent acquisition of knowledge, and interest in acquiring knowledge through information technologies, with a view to using them effectively in real-life practice.

During further advancement and implementation of various methods and innovative technologies in the system of education, it is necessary to develop more detailed methods in accordance with the need for such methods in various fields.

The development of leadership qualities will improve considerably with the implementation of advanced technologies into the system of education even in cases when the educational process is organized through the system of theoretical and practical education.

Thus, using information technologies in learning and work towards the development of leadership qualities will enable students to take a creative approach to their learning activity on the one hand, and to find new solutions to this or that learning problem on the other hand, which is the ultimate goal of becoming a leader.

The training of competitive teachers that are ready for effective professional activity should use various information technologies, including interactive ones. However, it is worth bearing in mind that a skilled teacher is always the centerpiece of any educational process.

The switch to a level-based model of personnel training should be reflected in the organization of the learning process and the inclusion of advanced educational technologies in the formation and development of professional teachers' competencies.



## Disclosure statement

No potential conflict of interest was reported by the authors.

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